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ABSTRACT

This paper focuses on parents' perceptions of and expectations for the teaching and learning of mathematics for themselves as adult learners as well as for their children. The research is part of a large parental involvement project in a working-class, Hispanic community. The work is grounded on the concept of dialogic learning (Flecha, 2000) both in our approach to the learning experiences in which these parents (mothers) participate and in our research endeavor. Project MAPPS (Math and Parent Partnerships in the Southwest) seeks to establish a dialogue that breaks down the hierarchical and hegemonic practices that often characterize parental involvement efforts in communities. The analysis of data from home-based interviews, focus group discussions, and written narratives reveals several themes related to these women's mathematical learning experiences. These themes revolve around concepts of friendship and intellectual engagement. Furthermore, to better understand their perceptions about the teaching of mathematics, the project has conducted classroom observations with a few of the mothers. These visits to their children's classrooms as well as to other classrooms and the follow-up debriefing conversation shed some light on parents' views about teaching and learning. Finally, as these parents engage as teachers to other parents, the project learns about what they focus on as they themselves plan and teach a mathematics workshop. (Contains 23 references.) (Author/MM)

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Uncovering Mothers' Perceptions about the Teaching and Learning of Mathematics

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In this paper we focus on parents' perceptions of and expectations for the teaching and learning of mathematics for themselves as adult learners as well as for their children. The research is part of a large parental involvement project in a working-class, Hispanic community. Our work is grounded on the concept of dialogic learning (Flecha, 2000) both in our approach to the learning experiences in which these parents (mothers) participate and in our research endeavor. We seek to establish a dialogue that breaks down the hierarchical and hegemonic practices that often characterize parental involvement efforts in communities such as ours. The analysis of data from home-based interviews, focus group discussions, and written narratives reveals several themes related to these women's mathematical learning experiences. These themes revolve around concepts of friendship and intellectual engagement. Furthermore, to better understand their perceptions about the teaching of mathematics, we have conducted classroom observations with a few of the mothers. These visits to their children's classrooms as well as to other classrooms and the follow-up debriefing conversations shed some light on parents' views about teaching and learning. Finally, as these parents engage as teachers to other parents, we learn about what they focus on as they themselves plan and teach a mathematics workshop.

Context: Project MAPPS (Math and Parent Partnerships in the Southwest)[1]

Project MAPPS is a four-year long project that focuses on parental involvement in mathematics. It is in place at four sites (Tucson, AZ; Chandler, AZ; San Jose, CA; Las Vegas, NM). The project started in Tucson in 1999 and at the other three sites in 2001. The implementation at the different sites may vary somewhat according to their local needs but overall we share some common goals. One such goal is to develop leadership teams (LT) (parents and teachers/administrators) that will help in the mathematics education outreach effort throughout the districts involved. In Tucson, we now have three leadership teams -- LT1 has been in place since 1999, LT2 since 2000, and LT3 since 2001. The project seeks to promote the leadership of parents in mathematics activities in home and school, through three components:

a) Leadership training sessions in which parents, teachers, and administrators come together to explore different learning styles, to learn how to facilitate workshops for the larger parent community, and to work on parent recruitment issues.

b) Mathematics Awareness Workshops (MAWS) that are open to all the parents in a given district and range over key topics in mathematics in K-12 (e.g., one workshop explored

[1] Project MAPPS is funded by the National Science Foundation (NSF) under grant – ESI-99-01275. The views expressed here are those of the authors and do not necessarily reflect the views of NSF.

multiplication and its different representations; another workshop centered on "discovering π"). These workshops are self-contained and last about 2 hours. Children and parents are invited to attend with the children being dismissed at some point in the workshop to allow for the parents and other family members to engage as adult learners or to discuss and analyze their children's thinking. In Tucson, where the project has been in place for longer, these MAWS are currently being facilitated by members of the Leadership Teams 1 and 2.

c) Math for Parents (MFP) courses in which parents in the Leadership Teams (and a few other guests) have an opportunity to explore mathematical topics in more depth. These courses meet for eight weeks in 2-hour-long sessions. We are developing five MFPs-- in algebra, geometry, fractions and decimals, numbers, and probability and data. These courses are taught by experienced instructors (teachers, university professors), some of whom are the authors of the MFP materials.

In this paper we will focus on our work in Tucson. Our work there is in partnership with a large school district (2 high schools, 4 middle schools and 13 elementary schools). This school district is largely Hispanic (82%) (mostly of Mexican origin) and 81% children on free or reduced lunch. Currently we have 33 parents, 25 teachers, and 7 administrators in the Leadership Teams. Each semester we have one MFP course, about 36 MAWS, and several other sessions focusing on Leadership training. In the next section we present the theoretical framework on which we ground our research. We would like to point out, though, that as is the case with many large projects, not everyone in the project staff comes necessarily from the same theoretical perspective that we envision in our research. Thus, some of the activities as they are implemented may strike us (the authors) as not quite reflecting the approach we would like to see. One such example is our concept of dialogic learning that we will explain in the next section. Although we advocate this approach as consistent with our orientation towards adult education, this may not be the case with, for example, some of the MFPs instructors, or some of the teams facilitating the MAWS.

Theoretical Framework

Our work draws on several bodies of research including the literature on parental involvement, in particular that which critically examines issues of power and perceptions of parents (especially minority and working-class parents) (Henry, 1996; Vincent, 1996) as well

as the research on adult education grounded on critical pedagogy and on the concept of ethnomathematics (Benn, 1997; Coben, 1998; Flecha, 2000; Frankenstein & Powell, 1994; Harris, 1991; Knijnik, 1996). We reject a deficit model that tends to portray families as the "problem" and instead argue for a socio-cultural perspective that seeks to learn from the families and children with whom we work with the goal to establish an authentic dialogue between parents, schools, and researchers. Our work reflects an awareness that, as Weissglass and Becerra write (n.d.), "Often classes or programs for parents are one-way transmissions of information and materials from school to parents. Rarely do parents, particularly those from groups underrepresented in mathematics, have an opportunity for their beliefs, ideas and concerns to be heard. (...) All parents need a safe place to share and explore their early experiences with schooling, their thoughts about their children's learning, and their attitudes toward mathematics" (p. 2). Along these lines, we have found Flecha's (2000) concept of dialogic learning particularly helpful. His work is grounded on the experiences of a group of adults in a working class neighborhood who participate in a literary circle. One of the key principles of dialogical learning is that of egalitarian dialogue.

> A dialogue is egalitarian when it takes different contributions into consideration according to the validity of their reasoning, instead of according to the positions of power held by those who make the contributions. (Flecha, 2000, p.2)

> The "coordinator" learns as much as, or more than, the "students." Even when he is very sure of something, he cannot impose it but must try to convince the rest of the group. (p. 4)

Although the education rhetoric often talks about the importance of parental involvement, the form that this parental involvement may take often goes unexamined and seems to be based on a limited array of possibilities, such as presence of parents in the schools. That is, those parents who are visible in the school are seen as "involved parents." What they actually do while they are in the schools, or what the parents who cannot spend time at school may be doing to be "involved" is not so often addressed. Research indicates that working-class parents as well as parents from certain cultural groups have historically had an uphill battle in advocating for their children's best interests in schools. Coleman (1988), Lareau (1989) and

Henry (1996) have discussed the influences of culture and socio-economic factors on the nature of home-school relationships. Reay (1998), in her research on mothers' involvement in their children's schooling, points out the different roles and approaches among middle-class and working-class mothers:

> [For the middle-class mothers] Educational problems, when they did arise, were due to deficits in schooling, rather than located in either themselves or their child.... In contrast many of the working-class women had learnt from their own experience of schooling that educational difficulties were due to failings in the individual, rather than the system. (p. 64)

Furthermore, Reay's interviews with immigrant women underscored the difficulties that many of them encountered as they tried to build on their cultural capital for their children's benefit. Their experiences with schooling were so different from what their children were experiencing in their new country that their cultural capital was of little use in their current situation. It seems that families from a dominant culture with a higher economic status tend to have more power in the school in advocating for their own children's needs. Where are the voices of the "other" parents? Our work is specifically concerned with the voices of these "other" parents.

Listening to and Learning from Parents

Our research is grounded on a phenomenological methodology (Van Manen, 1990) that relies heavily on participants' contributions to the experience. Through this orientation, the lived experience of each parent is considered significant and our goal is to try to capture it in our analysis and writing. Our sources of data include: a) participants' mathematical autobiographies and parent profiles; b) observations, field notes and videotapes of most events; c) audiotaped and videotaped interviews and focus groups; d) evaluation forms for each activity. In this paper we focus on parents' (mothers') views and beliefs about the teaching and learning of mathematics from three different angles-- as adult learners, as parents, and as teachers. We argue that learning about these mothers' perceptions about the teaching and learning of mathematics is not only essential towards the development of authentic dialogues between schools, families, and researchers but can also inform our efforts towards parental involvement in mathematics education. Researchers (Lehrer & Shumow,

1997; Peressini, 1998) have documented the frequent mismatches between the aspirations of reformers in mathematics education and those of parents and other community members in the communities where reforms are being implemented. This paper contributes to this body of research by engaging us in a critical examination of some of those mismatches.

In previous writings we have begun to address parents' views and beliefs about the teaching and learning of mathematics, in particular from two of the three angles: as adult learners of mathematics (Civil, 2001a;2001b; 2001c), and as parents (Anhalt, Allexshat-Snider, & Civil, in press; Civil, 2001a; 2001c). In this paper we summarize some of the key points from these other writings and expand upon them by focusing on three aspects:1) our more recent work on parents and university researchers observing in mathematics classrooms and the follow-up conversations; 2) a glimpse at our preliminary analysis on parents as teachers as they facilitate the Math Awareness Workshops; 3) the voices of three mothers as they reflect on our focus for this paper, namely what do they value in the teaching and learning of mathematics,

- For themselves, as adult learners in for example the MFPs courses?
- For their children, as in what they would want to see in their schooling?
- For their students, as in the parents who attend the MAWS that they facilitate?

These three mothers are: Elva Barrios, who is a member of Leadership Team 1(LT1) (so has been in the program since the beginning, although she had to withdraw during year 2). She has been facilitating Math Awareness Workshops (MAWS) for almost a year. She has 3 children (second grade, seventh grade, and the oldest finished high school two years ago). Elva is Spanish dominant, but has a fair understanding of English and speaks it a little. She currently works at one of the elementary schools. Martha León is also a member of LT1 and has been with the program since the beginning. She is currently a mentor for Elva's team. Last year she facilitated MAWS in a team in which she was the only parent. She has two children (second grade and preschool). Martha is Spanish dominant, but understands and speaks English. She currently works at one of the district's high schools. Jo Ann Valerani-Knoblich is a member of LT2. She has been facilitating MAWS for almost a year. She has 4 children (second grade, fifth grade, eighth grade, and ninth grade). She is English dominant with almost no understanding of Spanish.

Parents as adult learners: What they value

The pedagogical orientation in MAPPS is largely based on mathematics education reform principles. Participants work in small groups and are encouraged to share their ideas and bring up their questions. The parents in the MFPs courses received a manipulative kit and many of the activities make use of these hands-on materials. Overall, all parents agree that their current learning experience is very different from what they went through as school-age students (whether in Mexico or in the US). The fact that they can talk with their peers about the problems, and that they use so many manipulatives, and that they learn about different ways to do one problem are the most striking differences for them. These parents particularly value the notion of friendship, of coming together with friends to discuss mathematics:

> *You meet other people and you get to learn with other grown-ups.*
>
> *The gathering of many friends in a learning environment.*

These parents would probably agree with what FitzSimons (1994) points out as being crucial in working with adult learners "the need to establish an atmosphere of mutual respect and a feeling of community in which adult learners are encouraged to be independent learners and to share their expertise" (pp. 24-25). Working in groups is probably the feature that appears most often in the evaluation forms and in their interviews. The participants were also very appreciative of instructors that made them feel comfortable, that made an effort to establish rapport with them, and that "spoke at their level."

In terms of what content they would prefer to learn, it seems that the majority is very appreciative for any kind of mathematics content that they engage in. This is one area in which the differences across project staff and in mathematics education backgrounds perhaps play up most clearly. The content so far has been essentially academic mathematics and in fact parents ask for this kind of mathematics since they recognize it as what their children are doing in school and therefore they want to learn it too. But we have not really tried to engage them in activities that could be seen as grounded in critical mathematics education (Frankenstein & Powell, 1994; Skovsmose, 1994). We wonder about the possibilities of combining the adults' experiences with mathematics with the content of academic mathematics. As Benn (1997) writes,

> To learn effectively, individuals need their own ethnomathematics valued and then, by acquiring academic mathematics, would be competent to choose for themselves the most appropriate to use in different circumstances.... An emancipatory mathematics curriculum could validate each ethnomathematics whilst still acknowledging that many adults return to formal education to acquire the discursive practice and consequent rewards of academic mathematics. (p. 175)

The voices of Elva, Jo Ann, and Martha

What do these three mothers value as adult learners of mathematics? We have asked them this question on many occasions and through different avenues (e.g., focus group, written evaluations for the Math for Parents courses). But in what follows, we present what they wrote for the purposes of this paper. We asked them to feel free to talk about what they valued / how the felt as adult learners in general, not just about mathematics (for example, Elva has been learning English for some time as well as preparing for the GED).

Elva. Como alumna la mejor experiencia que he tenido es poder compartir con otros adultos en un salón de clases; mirar como se puede volver a otros tiempos y comparar como aprendimos de niños; y como para la mayoría de las personas es difícil aprender el inglés como segundo idioma, como hay palabras que por más que uno las practique no puede darle el mismo sonido o pronunciación; voltear ahora hacia atrás y mirar todo lo que he podido avanzar y todo lo que se puede hacer con voluntad y ganas.

[As a student, the best experience that I have had is to be able to share with other adults in the classroom; to see how we can go back to other times and compare how we learned when we were children; and how for the majority of people, it is difficult to learn English as a second language, how there are words that no matter how much one practices them, still cannot give them the same sound or pronunciation; to look back and see how much I have been able to move forward and everything that one can do with willpower and desire.]

Jo Ann. Groups, groups, very important, math for parents has taught me it's great to have individual help, like kids need one on one with the teacher or other children. How being in MFP has been as a learning tool for then teaching other parents as we become leaders. So encouraging for myself. My children look at me differently. It's exciting to learn, I can do it.

I needed to have these classes to realize I can do it and it's exciting to show other parents and have them go "I get it." Must feel like when teachers know kids get it.

Martha. Dice el refrán, "recordar es volver a vivir…"
Usar manipulativos que en mi tiempo no existían; convivir con otros padres que se encuentran en la misma situación que yo y compartir diferentes métodos de aprendizaje; conocer el interés de otros padres de como poder ayudar a sus hijos; compartir experiencias.

[As the saying goes, "to remember is to live again…"
To use manipulatives that were not available when I was a child; to be with other parents who are in the same situation as myself and to share different ways of learning; to learn about the interest among other parents as to how to help their children; to share experiences.]

Parents as parents: What they value for their children's schooling

In previous papers (Civil, 2001a; 2001c), we have addressed the theme of "parents as parents" in terms of their own participation in the program to be able to provide more help with their children's mathematics homework. Another salient comment in the interviews is the fact that these parents want to remain involved in MAPPS to inspire and motivate their children to continue studying by showing them that they are also taking courses and attending educational events.

In this section we focus on what we see as potentially very powerful towards the development of an authentic dialogue between parents, schools, and university researchers. We have conducted a series of classroom observations in which a group of parents and one or two university researchers visit mathematics classrooms in the Project schools and then meet to debrief the experience (see Anhalt, Allexshat-Snider, & Civil, in press). In what follows we focus on our more recent classroom observations in which the two of us went into two first grade classrooms with Martha León, thus giving us an opportunity to contrast these two teaching experiences. We will also discuss our visit with Elva Barrios and Jo Ann Valerani-Knoblich (and one more mother) to an eighth grade class.

As mathematics educators, we get the impression sometimes that we are constantly undergoing some kind of reform. Documents such as at the 1989 NCTM standards or the 2000 NCTM Principle and Standards have been particularly useful and influential in our

design of MAPPS activities. The parents are certainly immersed in group work, use of manipulatives, and multiple ways of doing one given problem. They do comment that they see this approach to learning mathematics as being very different from the way they learned and that, on the other hand, they see this approach being used in their children's classroom:

> *I also go to his class [her son's] and I like it because I see that his teacher is teaching them the same things that we are being taught....In [school's name], they are using the same material [manipulatives] that we are using here. So, I go to my son's classroom and I see that they are teaching them in the same way, with the same material.*

Yes, many classrooms may now be using group work and manipulatives, but what is the nature of the mathematics being discussed? We wonder, how can we go beyond what may be surface features? In order to better understand what parents look for and at in a mathematics classroom, we are conducting a series of classroom observation with the aim to address questions such as: 1) What do parents pay attention to when they observe a mathematics classroom? 2) How is it different or the same from what a mathematics educator focuses on? 3) What can we learn about these parents' beliefs and values about the teaching and learning of mathematics based on their reflections on the classroom visits? 4) What may be some implications to keep in mind as we think of implementing reform programs if we want parents to support these efforts?

Case 1: visits to two first grade classrooms

Martha León and the two of us visited her son's first grade classroom (Ms. M.) and the first grade classroom of one of the MAPPS teachers (Ms. H.). In Ms. M's classroom, the lesson centered on learning about "expanded notation"-- that is writing numbers such as 247 as 200 + 40 + 7. In Ms. H's classroom, the lesson centered on one of the modules developed for a MAPPS Math Awareness Workshop. This module deals with the interpretations that children often have about the equal sign in which they see it as "the answer is" as in 4+3 = 7 and not as "is the same as." Thus, many children (based on research studies) may think that statements such as 7 = 4+3, 7 = 7; 4+3 = 5+2, are false because they do not fit the format of "4+3=7."

In Ms. M's classroom, the children were sitting on the rug in a semi-circle (somewhat crowded, with 2 or 3 rows of children) with their eyes on the board and seemed really

engaged in the activity. The teacher introduced the idea of writing 247 as 200 + 40 + 7 and talked about how we could prove that in fact 200 + 40 + 7 is 247 (she did that by column addition). She then wrote numbers on the board and children came up to write the expanded notation. For 473, a child wrote: 400 + 7 + 3. There was some talk then with some children agreeing with him, others not. The teacher told them to remember that it was two zeros, one zero, no zero. After a few examples on this, she wrote: 500 + 70 + 5 and asked for the short name. A girl wrote 500; several hands were up and the children were saying "I know, I know." A boy wrote "5705." A girl then wrote "575." The teacher then told the children that what they had to was to circle the 5 [in the 500, and did that while she was telling them], then the 7 [in the 70 and did that], and then the 5 [in 5, as she circled it]. The children then said "it's a pattern!"

After that, several children came to the board (at the same time) to give the short name for several numbers (200 + 30 + 7; 300 + 30 + 3; 400 + 70 + 9). When a child got stuck or wrote something incorrect, the teacher would either remind him/her to circle the numbers or used a catchy expression that delighted the children and at the same time caught their attention and helped them remember what to do. After that board work, the children were given small booklets (that Ms. M. puts together) and the children continued practicing this topic.

While in Ms. M's classroom we were able to see her regularly scheduled lesson for that day, Ms. H. decided to do a lesson based on a MAPPS activity. We want to point this out because although the lesson turned out to be very interesting from a mathematics education point of view, we did not see a "regular" lesson that day. Ms. H. had become really intrigued by the research reporting on children's interpretations of the equal sign and wanted to "test it out" with her first graders. Much of the whole group part had the children sitting on the floor in a large semi-circle. Each child had a white board in which they would write an expression (e.g., 10 = 6 +4) and they had to decide if it was true or false (the teacher started by probing what it means for something to be true / false). After the children held up their white boards with their decision, Ms. H. would ask several children to explain their reasoning. She also had children come to the front and model with unifix cubes the expressions given. So, for 10= 6 + 4, one girl held 10 orange cubes and one boy put together 6 red cubes and 4 green

cubes and then the teacher asked the class "what can you tell me about these [pointing at the two columns of cubes]?" Some of the expressions the children worked on include:

9 = 9; 25 - 5 = 18 - 2; 4 + 3 = __ + 5

After the whole group activity, they worked in pairs on a sheet from the MAPPS module that has more expressions similar to the ones shown. They had to determine whether they were true or false and why. They could use cubes, tiles, or pennies. The children went back to their desks and worked on that sheet. After that, there was again whole group discussion in which different children explained their answers on the worksheet. At the end, one boy gave the class a challenge: 373 + 458 = 1481, True or False? (Note: none of the problems on the sheet or during the initial whole class discussion involved 3-digit numbers; they were all along the lines of the ones we have included here.)

Debriefing

Our aim in this section is not to compare these two lessons as this would be unfair for many reasons. For one thing, the parent, M.L, was very familiar with Ms. M's teaching style; she was a volunteer at the school and a regular visitor to this classroom. For us, this was our first visit. On the other hand, Ms. H. is a MAPPS teacher and is familiar and comfortable having us around. But, let's keep in mind that she taught a MAPPS lesson, rather than her "regular" lesson. What we want to do in this section is to highlight what M.L seemed to focus on in the two lessons, and raise some questions.

M.L. really liked Ms. M's teaching style and was full of admiration towards her,

> *She is a good teacher, a very good teacher, highly recommended, even those [teachers] who have children here send their children to her.... She is strict and good, ..., clear and concise.*[2]

That M.L. would like teachers who are clear and concise is no surprise to us. This is what she enjoys also as a learner herself. She is a quick learner who often cannot see the point of spending too much time looking at the same problem from different angles. M.L. liked the discipline in Ms. M's classroom. She valued the organization and the fact that the children were well behaved:

> *And the classroom is very organized, the children raise their hands, because she knows how to command respect... The children are really well behaved and they are*

[2] The debriefing with Martha León took place in Spanish. We have translated it into English.

on task, because she knows how to command respect. The children don't get up or get distracted when someone comes into the classroom, they are on task.

M.L also valued the use of different approaches and techniques to teach and the fact that the teacher explained things over and over until the children understood:

There are other teachers who teach a class and do not make sure that children participate....They only teach the class and consider it done. But she doesn't, she explains and explains until they understand, and then she does exercises with them on the board and then reaffirms it with individual work.... And she did it in three ways, she explained, participation, and individual work. ... And I like the expressions she uses, the "abracadabra, stick it with a zero", children find it catchy and they get the clue about what they have to do.

M.L. had a harder time with Ms. H's classroom (again, let's keep in mind that this was her first visit and thus was not familiar with the routine). She seemed particularly concerned with what she perceived as lack of organization:

Look, I thought that in the beginning it was organized. As the class went on and the teacher kept on talking, I think that the group was becoming more disorganized. She didn't have control of 100% of the children, because there were moments in which the children were doing whatever they wanted at their desks, talking.

To the question, "what do you think was missing in this class?"

Organization in the class, prepare the class, make it more dynamic.

In describing Ms. H's teaching approach, here is what M.L. said,

She only posed questions and questions, the children answered but she never told them why they were right or why they were wrong, or why it had to be done a certain way. She only listened. To me, to be honest, it was very monotonous. I didn't like it.... She never explained, "we are going to do this and it works like this," she just began talking and asking questions.... But she never explained one to one to the children... What I did notice is that among the children they were explaining it to each other, for the 10 = 6 + 4, one little boy was explaining it to another boy, instead of the teacher explaining, a classmate was explaining it.

To the questions, "do you think the teacher met her objective for the lesson? What do you think was the objective for this lesson?", she replied,

If it was equal or not. But she didn't meet the objective, she asked and asked but never said "this is equal to this." When the children were working on whether 8+2+4 is equal to 5+7, I was the one who explained it to the children with the coins, she never gave them a detailed explanation. I think that we need to explain to them the "why" behind things. And no, all she did was ask questions. She never told them if

something was right or wrong.... To meet an objective is to do an activity and that the results are 100% positive, not 85%.

We think that M.L. captured quite well Ms. H's teaching approach: she was asking questions, she was listening to the children explain their thinking. She did not go around saying "this is right, this is wrong." The children came up with reasons for their thinking and Ms. H. helped them out as she saw necessary. For example, when working on whether 20 - 5 = 17 - 2 is true or false, some of the children were struggling with the subtraction. Ms. H. scaffolded their thinking with the use of unifix cubes and her questioning technique. We cannot tell for sure if every child left the room with a 100% understanding of the equal sign, but we cannot tell for sure either if every child in Ms. M's class left with a 100% understanding of the expanded notation / short notation concepts.

These two experiences raise several questions for us. What does is mean for a classroom to be organized? Are children talking and moving around signs of disorganization? How important is this concept of organization in a parent's view of a classroom? (For example, we have had several parents commenting on the difference in children's behavior in classrooms in Mexico vs. classrooms in the US.) What does it mean, for parents, to teach for understanding? Of course, we know this answer will vary depending on the parents. But we are curious to see if as parents engage themselves as learners of mathematics, their view of teaching for understanding changes. M.L. seemed to like the use of expressions such as "Abracadabra, stick it with a zero" because children would find them catchy (which they did, as far as we could tell), and would help them remember what to do. What was the conceptual understanding in this? On the other hand, M.L. seemed uncomfortable with Ms. H's continuous questioning and her not telling the children whether they were right or not. As a mathematics educator, the first author did not feel this way but that is because this teaching style matches her own: asking questions and putting the ball back in the students' corner to let them figure it out on their own. But, how far can one push this method? What if it is left too open-ended (of course, this will depend on our differing levels of tolerance for open-ended situations)? Was M.L looking for some kind of closure / wrap-up to this lesson, in which the teacher explained the key ideas? What are the implications of having or not having such closure?

Case 2: A visit to an eighth grade class

Elva Barrios, Jo Ann Valerani-Knoblich, and one more mother visited an eighth grade classroom with the two of us. The teacher, Ms. R., finished her master's degree in mathematics two years ago and wanted to gain some school teaching experience before going on to her Ph.D. This was her second year at this school.

As the eighth graders walked into the classroom, the three questions for bell work were ready for them to do. The students were quite disciplined and it seemed clear that the social norms of this class were well in place by when our observation took place in December. Ms. R. used every minute of the 48 minute period. As she later said in the debriefing "It's very important to work the entire 48 minutes, even if they are talking while they are working. I don't let them do their homework in class because I think they should do it at home. And it bothers me when we don't work the 48 minutes."

True to her belief, the class period that we observed had the children on task from the minute they entered till they left. They worked on problem-solving, and in particular on combinations/ counting problems. The teacher first worked with them as a whole class on a problem that asked for how many different pizzas one could make if you have 3 toppings to choose from. She reviewed with them the different steps to follow in solving a problem and the problem solving strategies. Then she assigned them a problem to do in class (how many different combinations of nickels, dimes and quarters to make 45¢). They could work in groups, but most of the students worked individually. After the students had a chance to work on the problem (she was walking around asking questions and giving some hints), she engaged the class in a discussion to further analyze the problem ("what is the maximum number of nickels you could have?" "Can we have one with 6 nickels?" "Why not?"). Then the students had to make up their own problem and they needed to know how to solve it. They could work in groups but each had to come up with their own problem. Time on task was important, "you have 10 minutes. I'll keep you during lunch if you don't finish." She walked around and helped students think about how to write their problem. One of the students came up with a counting problem for which order was important (while it was not for the pizza or the coins problem). Ms. R. called all students' attention and asked them to think about how this student's problem (different arrangements of four colors) was different from the other two problems. In doing this, she was working on getting the students to see

the difference between permutations and combinations (without using the "formal" terms). A student [J.] shared his approach to the colors problem ("6 for red [he had listed all possibilities with red as the first color], you time it by 4 for the other colors, it's 24"). Ms. R. then assigned homework and made sure the students understood the problems. One of them focused on a seating arrangement of 6 people. As the students started giving her possible combinations, she said "let's think about what J. did for this other problem [the colors problem]" and left it at that.

Debriefing

The teacher stayed for part of the debriefing and commented on some of the difficulties that she had sometimes when teaching mathematics. It was interesting to note that although she pointed out that "you can't assume that they all know the same as 8th graders," Ms. R. had high expectations for the students. She saw her teaching difficulties more in terms of the students not making the same connections that she made and thus needing to adjust her approach, and not in terms of the students being at fault or lacking. There was an interesting exchange between Ms. R. and J.A. because J.A. was under the impression that at school (where she has children attending) they only called the parents for conferences if the children were not doing well. Yet, Ms. R. said that "here you have to meet with everybody. We ask the kids to take a note to their parents and to bring it back in order to know if they are going to make it. If they don't come, we call them." We wonder then about the communication gaps that may be existing in this (and other) schools, since according to the teacher, she had to meet with every parent and according to the mother, J.A., she had never been invited to a parent-teacher conference. (Note: Ms. R was not the teacher of any of J.A.'s children.)

After the teacher left the debriefing, the mothers talked about what they had observed in the class. They were highly positive about every aspect of the lesson[3].

> *J.A. :I did like her way of teaching, the way she acted with the kids. I like that she let them work together but asked them to make their own thing. I like this problem solving, I thought it was quick. I realized how short a class is, and she did quite a bit in those 48 minutes.*

[3] For this section we will have Jo Ann's comments in English and Elva's comments in Spanish to show one more dimension to our work, which is the language dimension.

Most of the discussion in fact centered on group work and what it means to work in groups. Our observations of Ms. R's class were that although the students were sitting in groups, most of the work was done individually. Although the teacher did allow them to work together, it seemed clear that there was a classroom management concern lingering, "you can work together, as long as you stay at your table." Or later on, "you can work in groups as long as each of you comes up with your problem. If your are having individual conversations and not working, it will be individual work." Thus, we actually wondered about the group work element and decided to probe more into the mothers' perception of what that meant. Elva commented on her own experience as an adult learner in MAPPS,

> *Yo pienso que sí, que es bonito trabajar en equipo porque tal vez sepamos hacer un problema de una sola manera, entonces para ver si la otra persona lo hace diferente. Se aprende que se hace de diferentes maneras, pero que todo viene siendo lo mismo. [I think that it is really nice to work as a team because we may know how to do the problem in only one way, and we can then see if the other person does it differently. We learn that we can do it different ways but that they all give the same result.]*

We then asked them whether they thought that the students in this class were working in groups,

> *Jo Ann: I saw a lot of them that were by themselves; others were helping each other. Most of them were doing it on their own. It seemed they chose to, they were more comfortable doing it that way.*
>
> *Elva: Lo que yo observé es que hacen su trabajo solos, pero ya que terminan piden opiniones o lo comentan entre si. Comentarios acerca de la clase. [What I noticed is that they work on their own but once they are done, they ask each other for opinions and they talk about it.]*

Unfortunately, we only scratched the surface of what we think would be very interesting to pursue: parents' perceptions of group work in mathematics. Group work seems to be one of the most often mentioned features of "reform math classrooms." Yet, what does this mean exactly? As we know, having students sitting in groups does not necessarily mean that students are working together as a group. In Ms. H's classroom (the first grade classroom described earlier), the children seemed used to sharing mathematical ideas with each other as Martha L. picked upon when she commented that the children were explaining what to do to each other. Elva commented that while in the elementary school her children were used to

working in groups, her daughter who is now in 7th grade was experiencing somewhat mixed messages in middle school:

> *Si alguien termina una idea, no deja que nadie la vea, hasta que cada quien saca sus ideas y ya todo el grupo comenta. Por ejemplo, en una clase una maestra le dice a la niña que si termina primero una idea, que no la comparta con el grupo hasta que los demás saquen sus conclusiones. [If someone finishes an idea, he/she is not to let anyone see it, till everybody has his/her ideas and then the whole group talks about it. For example, in one class the teacher tells the girl that if she finishes an idea first, not to share it with the group till the others have reached their conclusions.]*

A possible interpretation of this teacher's actions is that she is trying to make sure that every child gets a chance to think about the problem, rather than having certain children who may be thinking faster than others, always take over the group talk. But the girl (Elva's daughter) may be interpreting it as in contradiction with her experience in elementary school where they worked in groups. On the other hand, at the middle school level, there may be other reasons for why the students are not working in groups, as Jo Ann pointed out when she mentioned that they seemed more comfortable working on their own. She also said,

> *She [the teacher] was doing a lot of the teaching part. Once everyone understands it's easier to come up... when nobody is sure what the problems were, everyone is quiet. Nobody wants to give the wrong answer, especially in middle school because you'd feel like a big idiot.*

The theme of working in groups is a recurrent one in our data on parents as learners. It is one of the aspects they value most of their current experience and probably the one that is in stark contrast with what these parents experienced as children when they were in school--where they were not allowed to talk to their classmates during class. But, as these parents' comments show, there are still issues around having students work in groups, and we will finish this section with a short vignette that contrasts the MAPPS approach with what happens in some classrooms. This was told to us by a participant in MAPPS during the debriefing of a classroom observation that we have not discussed in this paper. Part of the debriefing centered, no surprise, on the issue of group work. This mother then shared that at a recent MAW she had suggested to her husband and her child (a third grader) that the three of them join another group to work on the activities, to which her child told her "Mom, that's cheating, you're copying." And the mother told him that in MAPPS one could work in group,

to which the child replied "so, we can copy /cheat then?[4]" The mother replied, "I told him that it was not cheating, but getting together and working as a team." We were left wondering what this child's experience at school was like in terms of individual vs. group work.

The voices of Elva, Jo Ann, and Martha

Our discussion on the topic of parents as parents, from the point of view of what they would like to see in schools not only for their children but for all children, was particularly lively. These three mothers are very much physically present in their children's schools. They know the teachers, the administrators, and they seem quite knowledgeable about the system. They seemed concerned at what they view as lack of interest among parents to really know what is going on in their children's schooling. Although we tried to counteract these feelings with what we know from research (e.g., barriers (language; cultural) that parents, in particular immigrant parents, find when they try to enter the school; the school as an intimidating place in which they do not feel welcome, etc...), these three mothers had lots of examples based on their everyday interactions with parents at schools to feel very strongly that the "problems in the classroom come from the home." They were upset at the fact that often parents who came to school did not even know their children's teacher's name; or that parents would come and complain about not having been informed about a certain event, when, these mothers stressed, there is a mechanism by which, for example, once a week, children are given information (fliers) to bring back to their parents. What these mothers said is that it was the parents' responsibility to, for example, go through their children's backpacks and see if there are notes there from the teacher; or on the day that they know the announcements are being given, explicitly ask their children for them.

On the other hand, they acknowledged that schools are not always welcoming to parents and that this begins with the personnel in the main office who often greets visitors (parents and others) in a less than friendly manner and in a questioning attitude that could be found intimidating. They also felt that more information should be made available. For example, one of the mothers explained the case of one mother at her school who received a note saying that her child was going to be placed in Special Education. This mother was really worried because she really did not know what this meant. She was able to get some explanation

[4] In Spanish, "sí podemos copiar entonces." Copiar could be translated by "copying" or by "cheating." Here we think that the implication is "cheating."

because she asked around but the feeling is that the school should have made sure that this mother was informed from the beginning and included in the decision process.

These three mothers seemed very supportive of and pleased with the teachers in their schools. As we asked them to write about what they would like to see happening in the classrooms (not only for their children but for all children), this is what they wrote:

Elva. (reflecting on her experience observing in classrooms that were not her children's). Al involucrarme en este programa, una de las cosas que empecé a hacer fue asistir a observar clases en diferentes escuelas. En todas tuve experiencias diferentes. Algunas maestras dan la clase por cumplir con su trabajo nomás el tiempo requerido, sin explicación ni contestando preguntas. Algunas otras lo hacen como yo creo que debe de hacerse, dando la clase haciendo preguntas a diferentes niños para mirar si están entendiendo, y después darles algún material sobre lo que se explicó para así confirmar que la clase entendió el contenido del problema.

[When I became involved in this program I began observing classes at different schools. I had different experiences in all of them. Some teachers teach only to fulfil their job requirement, only the time allotted, without explaining or answering questions. Other teachers do it the way I think it has to be done, teaching by asking questions to different children to see if they understand and then giving them some activity based on what was covered to reaffirm that the class understood the content.]

Jo Ann. I would like to see (Martha) tradition, strict, more discipline, who is the teacher and who is the student. [Teacher's] Home phone number is commendable. Lots of parents cannot call at school until after work. Too late. Make tutoring exciting, rewarding. Teachers need a little more authority. Let teachers teach the way they see the kids can learn. Of course, keep guidelines, you have to. But give them more freedom. Too much paper work, need more freedom.

Martha. Basada en mi experiencia y observaciones desde el momento que empecé a asistir a la escuela de mis hijos, prefiero el Método de Enseñanza Tradicional. ¿Qué es el método tradicional desde mi punto de vista? Basado en los siguientes puntos:

1) La disciplina en el salón de clases.

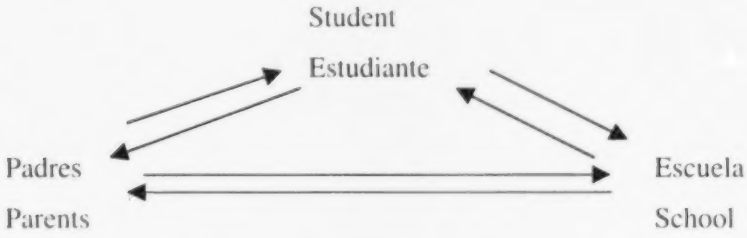
2) Definición clara y exacta de cada quien en el salón de clases: Alumno – Maestro.

3) La atmósfera de respeto que debe iniciarse en el ambiente familiar.

4) Tener en cuenta que la escuela es un centro de enseñanza y no un lugar donde se cuidan niños.

5) Utilizar métodos de enseñanza convencionales, sin recurrir mucho a ayuda tecnológica; es decir deben tener conocimiento de los diferentes conceptos y ya que exista tal razonamiento, pueden recurrir a la ayuda tecnológica.

Ahora me gustaría que el sistema de educación fuera una mezcla de lo tradicional y lo actual, claro sin olvidar que el ambiente y cooperación familiar es determinante en la proyección del estudiante en su ambiente escolar. Pienso que debería ser un ciclo de reciprocidad:



[Based on my experience and observations from when I started visiting my children's school, I prefer the Traditional Teaching Method. What is the traditional method for me? It is based on the following points:

1) Discipline in the classroom.

2) Clear definition of who is who is the classroom: Student – Teacher

3) An atmosphere of respect that has to begin in the family setting.

4) Keep in mind that the school is a center of instruction, not a child care facility.

5) Use of conventional methods of teaching without relying too much on technology; that is, they have to know the different concepts and once the reasoning is there, then they can use technology.

Now I would like that the education system be a mixture of traditional and current, but without forgetting that the atmosphere in the family and its cooperation are crucial towards the success of a student in school. I think that it should a be cycle of reciprocity. (See diagram)]

Parents as teachers: What they value in teaching other parents

After the first year in the program, teams of teachers, administrators, and parents started teaching other parents (and teachers and administrators). Although in the beginning the teachers tended to carry the teaching weight in the presentation of the workshops and the parents took more the role of assistants (there were of course exceptions), this year we have seen quite a diverse range of leadership roles among the parents. We have two parents who are mentors to Leadership Team II participants. One of those parents, Martha León, is a mentor to a team composed of only mothers (only very recently a teacher joined this team). The other mentor, B.P., has a team composed of one teacher, one facilitator (teacher/administrator), and one mother. We then have several parents who are facilitators for the Math Awareness Workshops and are thus teaching other parents in the district. This is quite a powerful model, we think, parents teaching mathematics to other parents. We have seen so much growth in parents' confidence at presenting mathematics workshops to other parents. We have also seen how they adapt materials from the Math for Parents courses and from the Leadership Training sessions and pedagogical strategies, and how they develop their own materials for their presentations.

Of course, it is not unproblematic. To illustrate what we mean by this, we will look at one example that centers on the teaching of the module "Equal or Not," which we have briefly discussed earlier as it is was the lesson that Ms. H. did with her first graders. From a mathematics educator's point of view, the first author had a lot of problems with that module. She liked the mathematical basis of it; she liked the idea of discussing what the meaning of the equal sign is and the fact that children (and adults) should feel as comfortable with expressions such as $7 = 4 + 3$ and $15 + 3 = 12 + 6$ as they feel with $4 + 3 = 7$. In short, she liked the message of the module as she saw its implications for the learning of algebra, but was concerned whether these messages were getting across in this module. Her concerns were grounded on her teaching experience and the misuse that students often make of the equal sign, combined with her actually seeing how the module was presented at several workshops (and it did not necessarily matter whether the presenters were teachers or parents). She saw it presented in a procedural way, as if the presenters were not aware of or did not buy the subtleties surrounding the use of the equal sign. As she wrote in a reflection on how this module was being taught,

My reaction to when I saw them present it was that of hearing children (or adults, I suppose) reading a text in a language that they don't yet master and therefore they don't know where/when to put the stress, the intonation, the enthusiasm.

As a mathematics educator, her concern was with what level of understanding of mathematics is necessary to facilitate these workshops. The module "equal or not" looked simple on the surface, and in fact following the facilitator's notes would probably get one through, but what message will the parents attending the workshop walk away with? If we rely on the evaluations, then there seems to be no problem. The evaluations are in most cases very positive and the parents are extremely appreciative of everything that they have seen in the MAWS.

Another module (Garage Patterns) that was presented around the same time as Equal or Not had to do with looking for patterns, making tables, and graphing (the patterns were all linear). This module was certainly more demanding in terms of mathematical content. This module was a middle school level one. Our middle school team had presented this module and had also presented the Equal or Not on a different night. During the debriefing of the latter, the first author decided to ask them in a very direct way about how the two modules compared. She openly told them that she was concerned that the message of the Equal or Not module might get lost and thus maybe turn off parents, while the Patterns module seemed more recognizable as mathematics:

Jo Ann: If I come to this one [Equal or Not], if I were a parent and didn't have anything to do with MAPPS, this would bring me to go to others, I would come back.

C. (mother in the team): You don't think it was too boring?

Jo Ann: No, not at all...If I had gone to this one, I'd stay...if I had gone to the Garage Patterns or Step by Step, I would have gone, Ah! Ah! this is too much thinking after school.

Marta: I agree with the Garage Patterns, because the graphing and all that, the mathematical complexity, but on the other hand...

C.: It was exciting though...

Jo Ann: It was, once you get it but meanwhile it was scary, intimidating and I would have gone, I don't want to do anything to do with math. That's how I look at it, I don't have a math background, if I was just a parent that helps her kids

after school...well not anymore because I went to the MFP and that really helped me, it made me feel good.

Marta: This module was very well presented, that's very clear. Michelle with the transparencies and John explaining the questions, you did a great job, the message was very important. But I am familiar with that, I'm a math educator and I'm going Yes! Yes!... but now I am thinking I am a parent who knows nothing about MAPPS, not particularly interested in mathematics, most of the times they were sitting and listening to you, and you were discussing this thing of equal sign, big deal!

Jo Ann: No offense Marta, you are very educated, you have a doctorate you are a smart girl, a lot of this parents are not, me included went to high school, a couple of years of college and that was it, and certainly wasn't in math. In that aspect, you just because you have so much education....intimidation is a big ... specially with teachers and the parents, and the parents are intimidated by the teachers and the parents maybe are not that bright, that's how a parent feels though, now that I see and know how they are really like, I don't feel that way (laughs).

J. (teacher in this team): It is a very elementary concept and this is a elementary workshop that we are giving, and I think for these parents it is very important for them to have something that they can understand and know they can help their child. I disagree with the fact that I think the ones that came tonight were interested... any type of help is good,... to you (Marta) you know so much about math, this might seem as a very very simple operation where a lot of people weren't doing anything but basically listening to things, it was easy enough to where they really could grasp on and work with their child in that look to their child's homework and say do you know what this equal sign means?

Jo Ann: I agree

Marta: the concept is not basic it is very difficult, that's what I've been trying to say.

Jo Ann: I thought so before I did this.

The first author (Marta) is not convinced yet that she got her message across. It is almost as if they thought that she was saying that the concept in Equal or Not was so simple that it may have been lost, while in fact what she was trying to say is that it was so subtle that it may have been lost. On the other hand, these mothers (and the teacher) seem to think that the module Equal or Not was a success exactly because it was simple and it dealt with something that the parents could relate to. But the important point is the nature of these exchanges. The

parents expressed their opinion, the teacher expressed his, and the mathematics educator expressed hers. Let's recall what Flecha (2000) writes,

> A dialogue is egalitarian when it takes different contributions into consideration according to the validity of their reasoning, instead of according to the positions of power held by those who make the contributions. (p.2)

The possibility to have these exchanges in which we talk about teaching (and learning) while coming from different experiences and backgrounds and we listen to each other's point of view has been extremely rewarding, at least for us. Most of our conversations have been between parents and university researchers. We do acknowledge, though, that we are seriously lacking in dialogue between teachers and parents and between teachers and university researchers (about working with parents). We are hoping to undertake these dialogues in our upcoming work.

The voices of Elva, Jo Ann, and Martha

In the previous section we have focused on some of the exciting challenges in having parents teaching mathematics to other parents. We are only beginning to analyze this aspect of our work, but one could think of some parallels with the work with beginning teachers as they start teaching mathematics. What role do their beliefs about and understanding of mathematics play in their teaching of these workshops? This is one question that we hope to address as we focus more on this component of the project. But, differently from the experience with beginning teachers, these parents are teaching other parents. They are teaching people like them, with children in their children's schools, with similar concerns about their children's education. Several of the MAPPS parents have mentioned that parents often feel intimidated by teachers (or "university people") teaching them. Parents may be able to better establish a link by directly connecting with their experiences. We asked the three mothers to share with us what they pay attention to when they are facilitating a Math Awareness Workshop.

Elva. Mi experiencia con MAPPS como maestra es explicar a los padres como trabajan sus hijos en el salón de clases y familiarizarlos con el material que usamos y darles a entender que es el mismo material que sus hijos usan en el salón de clase; explicar como aprenden sus hijos; darles confianza diciéndoles que yo también soy mamá y que al igual que

ellos también puedo tener dudas y que estamos dispuestos a volver a explicar cuando no entiendan algo de la clase que se está dando.

En conclusión, lo importante es hacerlos sentir en confianza para que se animen a involucrarse en este programa.

[My experience with MAPPS as a teacher is to explain to the parents what their children do in the classroom and familiarize them with the material (manipulatives) that we use and tell them that it is the same material that their children are using; to explain how their children learn; to give them confidence by telling them that I am also a mother like they are and that I may also have doubts and that we are ready to explain something again when they do not understand it.

In conclusion, the important thing is to make them feel confident so that they will be encouraged to join this program.]

Jo Ann. First that I understand it and that I can ask for help. That there is a comfortable setting. And that parents know that I am teaching but they are teaching me too, not to make them feel like dummies. Let them contribute as much as I am contributing.

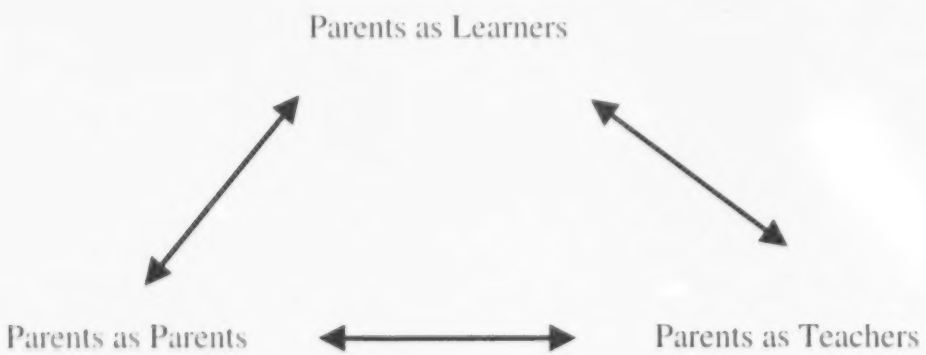
Martha. Leer y revisar cuidadosamente el módulo para simplificar a lo más interesante y fácil de demostrar sin restarle la esencia del mismo; adoptar un lenguaje claro y adecuado al nivel de entendimiento de los asistentes sin quitar su importancia a los términos matemáticos; elaboración de materiales de apoyo para las transparencias, para que al mismo tiempo la instrucción sea visual (proyector) y exploración de los materiales para hacer una conexión entre ambos métodos.

[To read and review carefully the module to simplify and extract the most interesting and easy to show parts without taking away its essence; to adopt a clear language appropriate to the level of understanding of the audience without leaving out the importance of the mathematical terms; the preparation of support materials for the overhead transparencies, so that the teaching can be both visual (overhead projector) and exploration of the materials to be able to connect both methods.]

Parents as Learners, as Parents, and as Teachers

As we reflect on the different components presented, namely parents as learners, parents as parents, and parents as teachers, and as we pay particular attention to the voices of the

three mothers featured in this paper, Elva, Jo Ann, and Martha, we see these three components providing us with a possible model towards the participation of parents as intellectual resources in children's' schooling. As our findings and these three parents experiences have corroborated, participating in the Math for Parents courses and in other opportunities as adult learners has given them the confidence to become teachers of other parents and also presented them with an array of possibilities as to what school mathematics could look like. This is turn and combined with classroom observations has made them particularly aware of issues surrounding the teaching of mathematics, which could lead to their becoming advocates for a good mathematics education for all children. By doing what Elva does in the MAWS, sharing with other parents what teaching mathematics in the schools looks like and by familiarizing them with the manipulative materials and the kinds of activities that their children are (should be?) using, these parents are enabling other parents to establish bridges with their children's schooling experience. We see these three components informing each other in a cyclical way, as shown below:



We have talked about parents as adult learners, parents as observers in classrooms, and parents as teachers to other parents. What we have not addressed, but Martha León did in her debriefing of one of the classroom observations, is the idea of parents as teachers in the children's classrooms. She was reflecting on an experience that was shared from another parent project in a different state,

They have a program in which parents prepare themselves and teach children in the classroom. I found it really interesting... that the teacher would tell us, "for such date, prepare a class and come give it." I liked it, but I don't know if the teacher would accept this idea.... So, [in that other program] instead of teaching other parents, they [the parents in the program] prepare these classes and the children pay more attention because it's their parents teaching the class, they participate more. Well, one never knows how they are going to act.

Some of the parents in MAPPS are in fact teacher aids and thus do teach in the classrooms, but what would it look like to have other MAPPS parents go into a classroom and teach a mathematics lesson? What would it mean for the school / the system tradition to have parents come into the classroom as teachers of mathematics, particularly working-class / cultural / language minority parents? This seems quite different from what we think many schools envision as "parental involvement"... certainly worth considering. We will end this paper with an excerpt from a reflection written by the second author, Beatriz Quintos, who reminds us once again of the importance of viewing parents as intellectual resources:

Parents assumed the role of facilitators, rather than the traditional role of teachers. They did not transmit theoretical knowledge to parents but shared with them their learning and their experiences since they are also immersed in a learning experience. A team of facilitators that was composed only by parents always emphasized in their sessions, that they were parents not teachers, sharing their own learning to help other parents help their children. This had a huge impact in the relationship not only of the guests with the instructors but with the math content. This comfortable atmosphere contributed to parents (students) not feeling intimidated by them, as they were the teachers but also parents, just as them.

When the parents receive the modules, they get together to plan the workshops they are in charge of. It was amazing to see the possibility of parents, once they constructed the math knowledge, to take ownership of the learning experience they led. They organized the activities of the module in a way that made sense to them and they created extra materials in order to facilitate their teaching.

We need to value parents' knowledge of teaching. Every person has gone through learning experiences. Positive or negative memories of our own teachers give us the opportunity to reflect on what works for us as learners. It has been clear in the parent-child interactions observed at the workshops that parents use different strategies to help their children. At a workshop, facilitated by teachers, there was a father who sat down with her daughter, and as soon as the session started, he began posing questions to his daughter. His daughter would ask for the answer, and he never gave it, yet kept leading her to the answer using inquiry. He was a guest parent who came for the first time to the workshop, still he was using powerful teaching strategies and we need to remember this everytime we meet with parents.

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